ADMINISTRATIVE - INTERNAL USE ONLY

80-01003a
Box 1 Fld 6

(5)

# PROPOSED PLAN

1971-1972

19 MAY 1970

ADMINISTRATIVE - INTERNAL USE ONLY

Approved For Release 2000/04/18 : CIA-RDP80-01003A000100060001-8

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# I. INTRODUCTION

In a memorandum dated 8 May 1970, [redacted] STATINTL directed that a small ad hoc group of young OCS professionals be assembled to develop a general hardware-software plan for the next two years. The following report is a result of the meeting of that group. The participants were:

| | | |
|---|---|---|
| STATINTL | [redacted] | SAD/Chairman |
| | | SAD/Member |
| | | ISD/Member |
| | | OPS/Member |
| | | OPS/Member |

For the purpose of this report, the following definitions are applicable:

| | |
|---|---|
| ASP | A system where one computer controls the processing by scheduling the jobs to be run on a number of computers and also handles the I/O for the other computers. In this report, it refers to the idea of one computer scheduling jobs for all other batch computers. |
| Customer | Entity inside or outside of the Office of Computer Services receiving a service. |
| Failsoft | A system designed so that if a major component fails, the system is still able to operate in a degraded state. |
| OCS | Entity in Office of Computer Services providing a service. |
| Programmer | A programmer from any component in the Agency. |

| | |
|---|---|
| **Switch** | A specially designed and programmed computer or combination of interconnected computers (depending upon required capacity) to which are connected all terminals and remote devices such as card readers, printers, and punches. To this computer are attached all batch and time sharing computers in the system so that it is able to logically connect any terminal or remote device to any of the attached computers, or to logically connect any two batch or time sharing computers. |
| **Terminal** | A keyboard input device (e.g., a 2260 or 2741 type device). |

## II. OCS OBJECTIVES

Generally, an attempt has been made in this report to establish a set of objectives toward which OCS hopefully might progress during the next two years. The following is a discussion of these objectives and suggested solutions to the problem of fulfilling such objectives:

### A. Improved Computer Services

If OCS is to increase its computer service capability in the next two years and parallel that increase with an equal improvement in the quality of that service, a plan for upgrading the present computer system is an absolute necessity. The following is a discussion of a possible solution to the upgrading problem based upon some predefined assumptions:

#### 1. Assumptions

a. The majority of work processed by OCS, including information retrieval type applications, is batch oriented and can be processed efficiently on a batch system provided turnaround time meets the user's needs. This may mean that turnaround for certain types of jobs, such as compiles, should be no more than thirty (30) minutes user-to-system-to-user. The requirement for this level of turnaround has led many programmers to use the time sharing system for what are really batch jobs, since the present input/output systems of the batch computers prohibit this level of turnaround on a regular basis. The system proposed in Section 2 is aimed at providing user-to-system-to-user turnaround consistent with user requirements by expediting the input of jobs to the system and return of output from the system. The following is our initial estimate of the performance required for job turnaround from the computer system:

| Type of Job | User-to-User Turnaround |
|---|---|
| Quick shots (compiles, assemblies, & short compile, load and go runs) | 30 minutes maximum |
| Debugs (logic checkout runs) | 2 hours maximum, aiming at giving 3 to 4 shots a day. |
| Production runs | These would be scheduled with Operations and given turnaround consistent with priority of the job and resource usage. |

b. Provided that the user is given his desired turnaround on batch jobs, the requirement for time sharing for the next two years appears to be in the following areas:

1) File Editing

This use of time sharing is the means recommended for users to get jobs in and out of the batch system. Thus, we expect a significant increase in file editing by time sharing users so that there would be an average of one active file editing terminal for every three or four programmers who are in the program debug stage of a project. The number of terminals for production users would be proportional to the number of jobs run and to the number of people using the terminal to submit jobs.

2) On-Line Information Retrieval

Currently, there are six terminals devoted to information retrieval systems. We expect this number to increase gradually as more information retrieval systems become operational and the supporting computer systems are put into production. However, we feel that much of the information retrieval work could be

adequately done with a batch oriented system if the user were given turnaround consistent with the needs of his project. By adopting a batch approach where possible, the implementation of a computer system to handle information retrieval applications would be significantly simplified, since the number of on-line terminals needed would be less than the number needed if all applications were done on-line.

3) True Time Sharing Programs

We believe that currently there are few applications (if any) which really require true time sharing programming. As time sharing systems are improved, the requirement for time sharing programs can be expected to increase and to begin to replace some batch programs.

4) APL, Basic, etc.

The requirement for this type of time sharing application is expected to increase at a moderate rate in the next two years. We believe that if adequate batch service is provided, the need for APL-type systems will grow as OCS is able to implement them, but that lack of such systems will not adversely affect the users.

5) Systems Development

This is one area where the current time sharing system can be of significant help to the systems programmer due to its extensive debug aids. This use of the system can be expected to remain fairly constant since it is not expected that there will be a large increase in the number of programmers developing systems.

2. Proposed Computer System

a. Objectives

- Standard interface of the user to the computing facility.
- Simplification of new system installation.
- Overall system reliability.
- Improved turnaround time.

b. Basic Design

In this proposed system, the terminal has been adopted as the primary form of input and appropriate output. Terminals would be supplemented with remote and local printers, card readers, punches, and any other appropriate I/O devices which would be accessible to all computers in the system through a central switch. Eventually, a data bank computer could be added to the switch and would store large files that need to be on-line. The files would be accessible to all computers through the switch, allowing computers of different vendors or operating systems to share on-line storage.

All computers -- batch and time sharing -- in the system would be connected to the central switch. Terminals would be switchable between time sharing systems via software in the switch, and all computers would be capable of getting input from the switch and sending printed and punched output to the switch. The switch would be capable of being connected to computers of different vendors and with different operating systems (see Appendix II for diagram). The potential exists for interfacing with communication networks such as DATACOM, giving the network stations the facility of remote job entry to the OCS computer system.

The switch would thus act as a large remote job entry system for all batch computers in the system. Incorporated with the switch, either operating in the switch computer or in a computer connected to the switch, would be a job scheduling program that would

direct the flow of jobs to the various batch computers according to scheduling priorities determined by OCS management and to system load. The scheduling program would also schedule long and short production jobs so that idle batch time could be put to use when the work load drops off during the prime shift.

The scheduling computer could also be programmed to serve as an ASP type monitor for all the batch computers by directing mounting of tapes prior to sending jobs to a batch machine and making sure that needed disk packs are mounted.

c. Discussion

1) Common Interface

The switch would provide a facility whereby any terminal in the system could be logically connected to any computer in the system. When a new terminal is installed, it need only be connected to the switch to make it available for use with all terminal oriented systems. Conversely, when a new terminal oriented system is installed, once it is interfaced to the switch, then all previously installed terminals may use it, even though the new system may not have been designed to handle the terminals installed.

The installation of new batch computer systems is also simplified since once the new computer is interfaced to the switch, it is accessible to all users of previous systems, and the new computer is also able to use existing special peripherals without major changes other than the switch interface.

2) Maximum Use of Resources

By having one computer schedule the work of all the computers in the system, maximum use of resources should be obtained once the scheduler software is properly tuned. The scheduler could also measure output of each computer to provide data needed to spot

trouble areas within the system. The scheduler would be able to alter the schedule of jobs when conditions in the system suddenly change (e.g., a computer going down or a high priority job entering the system).

3) System Backup

The problem of system backup, with proper planning, is easily handled by the proposed system since the modular design allows critical components to be backed up individually and switched into the system when a primary component fails. The system can be failsoft so that if a major component fails and that component is too big to back up, then the critical work can be switched to a secondary, smaller compatible computer. This approach to backup would allow the installation of a single major computer so long as critical work could be done on a smaller computer in emergency situations.

4) Implementation

The implementation of a system of the type proposed should be given special consideration. The following should be design objectives of any system:

1. Upward Compatibility

Systems should be upward compatible so that each new version will run all programs that ran on previous versions. Where this is impossible, special assistance should be given users who are required to convert programs. This requirement should apply to new verions of existing systems as well as new systems.

2. System Stability

A new version should not be implemented until it has been tested and proven to be stable. The system should never go backward from a performance standpoint.

As a means of achieving the above goals, it is recommended that development hardware be provided the systems group so that new versions can be developed without disturbing production systems and semi-production testing can be done prior to conversion to a new version. This could be done by including in the system a computer which the systems group could use for development and Operations could use to provide system backup and production processing during peak load conditions. By providing such computer hardware for all major computer systems in the center, then a mini system could be configured and used in a semi-production state prior to installation of new versions. This same technique could be used to locate problems in new versions of OS by bringing up the new release on the systems machine and letting users make parallel runs during the testing period. With the switch, this could be automated by saving all jobs and running them at night or on weekends on new versions.

5) Effect of Short Jobs on Production Jobs

The fast turnaround on the quick-shot jobs can be provided with current batch processing systems with only minor changes to the scheduling programs and without significantly affecting turnaround of the longer running production programs. By applying queuing theory to the data available on jobs run in the center, it is possible to estimate the increase in turnaround of longer running jobs which would result from this type of priority system (refer to Appendix IV for example).

6) Contractor RJE

With the system connected to a DATACOM type network, it would be possible for Agency contractors connected to such a network to develop Agency software on OCS computers via an RJE system, thus saving the Government considerable money. This would also simplify the problem of implementing contractor programs on OCS computers. There are security considerations to this which would require further study but which most likely could be solved with proper planning.

7) Specialized Peripheral Interfaces

The proposed system would greatly simplify the installation of specialized peripherals for general use (e.g., a micro film printer), since once the interface to the switch was complete, all computers would have access to them.

8) Labeled Tapes

With the programmer becoming more removed from the actual running of his jobs, we feel that problems resulting from improper tape mounting could be solved by converting to a labeled tape shop. We recommend that the use of labeled tapes in OCS be restudied in light of the above.

9) Data Bank Computer

The data bank computer would provide a means whereby online data could be stored in one place and accessed by any computer in the system. While this is not a current requirement in the next few years, it could become an absolute necessity as computer utilization increases. This would also facilitate the implementation of new storage devices such as a bubble or laser mass storage devices. Once a new on-line storage device was connected to the data bank computer, the existing computers could use it without modification.

10) See appendices I, II, and III for a) a proposed plan of major events to implement the system; b) a block diagram of the system; and c) a list of major projects which need to be started in support of the system.

B. Improved System Support

To insure a meaningful approach to the upgrading of OCS computer services, we recommend that a single system support group be formed. This group should be tasked with:

- System Planning
- Software Support
- System Monitoring

1. System Planning

To solve the problem of planning for future needs, OCS should try to improve upon its present techniques by allocating to the proposed systems group the responsibility to:

a. Assess the present needs of the Agency as they relate to the computer services required of OCS, estimate future needs and levels of performance required, and propose hardware and/or software systems to satisfy those requirements. OCS should provide the necessary leadership in estimating future customer needs for computer capabilities (based on present usage and industry trends) and acquiring new systems that will improve the level of computer service.

b. Conduct feasibility studies for proposed new systems, make recommendations based on these studies, and supervise the development and implementation of approved systems.

c. Coordinate all major projects which interconnect in any way with the OCS computer system.

2. Software Support

In the area of software support, the systems group would have responsibility for the development, acquisition, implementation, and maintenance of all systems software. This is essential to insure an effective level of computer service on a continuing basis. The following is a list of the areas of support this group might be concerned with during the next two years:

a. Time Sharing Systems

- File editing.
- Information retrieval.
- Special purpose terminal languages (e.g., APL).
- Interactive problem solving programs.

b. Batch job processing, both remote and local.

c. Communications Front-End System

- Software to allow the transfer of data between terminals, time sharing, batch or special purpose computers, remote card reader/punches and printers, special purpose devices (e.g., BR/90), local peripherals, etc..
- System and job scheduler software to allow for efficient use of all system resources, to provide for optimum job turnaround, and to insure checkpoint/restart capability.

d. Mass Data Storage

- Data management software to allow for storage of data in a way that would be transparent to both man and machine, thereby enabling impact-free additions or deletions of storage devices to and from the overall system.

The data transfer and system scheduler areas will become increasingly important as OCS evolves toward a more complex computer system such as that described in Section II-A of this report.

3. System Monitoring

As the complexity of computing systems increases, it becomes necessary to provide a means of measuring performance of those systems. A systems monitoring capability should be developed to evaluate new and old hardware and software systems within OCS and supply statistical data that will aid in determining:

a. Whether efficient use is being made of the existing systems.

b. What hardware and/or software improvements can and should be made in the future.

c. When possible flagrant abuse is being made of system resources by individuals or groups inside or outside of OCS.

d. Where trouble areas reside within the systems and how to alter a given system to alleviate the problems.

To conclude, the quality of the system support will have a direct relationship to the quality and even the success of any computer system that evolves.

C. Improved Customer Relations

As OCS's professional capabilities increase, its leadership throughout the Agency in the computer field will be more readily accepted. This is a recursive procedure since in order to upgrade ourselves, we need more challenging tasks from customers. In light of this, we feel that the following areas are of importance to the improvement of OCS/customer relations:

1. Accounting

We feel that user management is entitled to a full accounting of the resources used by them within OCS and that this need can be best filled by adopting a cost accounting system. This would allow management at all levels to spot abuses of the computer system facility and, more importantly, to provide for accountability of project resources. This would also require that OCS provide a more professional service and assure the customer that he is getting the best service possible.

Any accounting system adopted should, of course, account for both equipment and people. In addition, the cost should be identified in terms of time and dollars. Prior to adopting a cost accounting system, considerable thought should be given to exactly what information will produce the most useful results. That is, besides being able to determine the amount of machine time or the number of man hours spent by one person on the design and coding stages of a program within a project, the

system should provide an account of total expenditure of resources by project.

With a flexible and adequate accounting system, supervisors, managers, and systems programmers could become aware of problems before they grew out of proportion (e.g., system problems, poor work habits, etc.).

2. Contract Review

a. Problem Areas

1. A substantial amount of OCS manpower has been spent converting computer programs written by contractors on machines that are not compatible with those in OCS. In most cases, this expenditure of manpower could have been avoided if a contract had been written and/or monitored correctly.

2. To allow for a long range plan of any integrated computer system, it will be necessary for OCS managers and system designers to know future requirements. OCS must know at the earliest possible time the resources required to support contracted software to be implemented and run on OCS computers.

b. Solutions

1. A mechanism is needed to insure that computer oriented people are involved in the writing and monitoring of contracts in which computers are involved.

2. Offices that do not have computer expertise should be strongly urged to seek help from OCS with regard to hardware and software contracts.

3. Offices that maintain their own computer expertise should coordinate contractual plans with OCS when the OCS facility may be used.



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c. The advantages of these solutions may be obvious but are enumerated here for clarity:

1. More easily implemented (on OCS machines) contractor written computer programs.

2. Potentially, a better quality product from contractors.

3. Hopefully, the avoidance of costly errors made by managers or analysts who are not sufficiently familiar with computers to make such decisions.

3. Programmer Aid

Increased computer power and utility solve some problems. Increasing programmer expertise may solve the rest.

a. Training

The general class of training to which we address ourselves here is not of the formal ADEPT type but rather of the short course or seminar variety aimed at the more experienced programmer. In view of this, we make the following recommendations:

1. Small classes.

2. Scope of the topic discussed at any session should be narrow.

3. Duration of any one session no more than 1/2 day to avoid interfering with programmer's commitments.

4. Course topics should be dictated by programmer deficiencies or interests in specific areas. Feedback from managers, supervisors, programmers, operations, and systems people can be used to determine specific training needs.

5. Participation on a voluntary basis may work for interesting or crucial sessions, but the concept of requesting that specific programmers attend certain courses should be considered.

6. Instructors for the ad hoc courses discussed in this section might be chosen based on experience in a given area. (A spin-off may be created here, giving experienced programmers a teaching or seminar leading experience.)

7. To better define the scope of material that might be presented at such seminars, a sample list of topics follows:

   a) 7-track tape versus IBM 360

   b) User libraries

   c) Tape disposition (DISP) in OS/MVT

   d) Creating overlayed programs

   e) Simplified JCL

8. Miscellaneous areas for potential training:

   a) Intermediate and advanced programming techniques.

   b) Optimizing code for speed.

   c) Optimizing code for minimum core.

   d) The art of debugging.

b. Problem Solving

1. A focal point should be established where all system anomalies could be reported and where programmers would bring unresolvable bugs.

2. The type of service desired here is for one man who could be available each day; his primary task would be to respond to programming or system problems. He need not be the same person all the time, nor need he be the person who finally solves a given problem.

3. Two types of people might fulfill this requirement:

   a) Key qualified personnel filling the position on a rotating basis, who can expedite solutions to problems.

   b) People of less experience who are in the position to learn a great deal by being on the spot, acting as problem solving coordinators for a longer period of time.

c. Programming Help

1. Besides his immediate supervisor and peers, a programmer knows few places where he can freely seek technical advice. Various types of consultations may be desired on the following:

   a) Algorithmic techniques

   b) Program design

   c) Program design critique

   d) Program critique

2. Some possible solutions follow:

   a) Identify qualified OCS personnel who can act as consultants at large.

   b) Provide employee experience profiles to interested parties.

   c) Open lines of communication across OCS divisions so more is known about "what the other guy is doing," giving programmers a better idea of where to go for help.

## III. SUMMARY

The following are the four major points contained in this paper:

A. Processing Requirement - Batch

It is felt that the requirements for computer processing (including most information retrieval applications) by OCS and its customers in the next two years can be satisfied with batch processing computers, provided that the user-to-system-to-user turnaround is consistent with project requirements. The requirement for an expanded time sharing capability (that is, above and beyond a file editing and limited information retrieval capability) can be expected to grow, but the absence of an expanded time sharing system (provided turnaround of batch jobs is sufficient) should not adversely affect computer users.

B. Integrated Computer Network

It is felt that OCS should move in the direction of establishing a computer network where all terminals, remote devices, and batch and time sharing computers are connected to a central switch. The switch would provide a remote job entry facility for the batch computers, getting jobs from time sharing computers and remote devices. The switch would also enable any terminal to be logically connected to any terminal oriented system resident in any computer. The proposed network should:

1. Increase the efficiency of programmers and users by making the computer easier to use. The progress of computer related projects would be less likely to be limited by program turnaround and more likely to be limited by other project resources such as programming capacity.

2. Provide a flexible system that will enable OCS to respond more quickly and effectively to the changing requirements of its customers.

3. Provide a stable user interface to OCS computers so that the changes by users resulting from new versions or systems will be minimized.

4. Provide a modular system so that the installation of new peripherals or computers is simplified, by providing a standard interface for interconnecting sub-systems.

C. Establishment of a Systems Group

It is felt that the establishment of a systems group with a broad area of responsibility is essential to the implementation of a system such as the one proposed. The following are some of the points that we feel support such a conclusion:

- The increased interdependence of systems and sub-systems.
- The need to get the most out of the systems personnel available due to the shortage of trained personnel.
- The need for communication and coordination between systems personnel required with an interconnected system.
- The amount of detailed planning required for the successful implementation of a new computer system.
- The lead time required for the installation of a new system, and the resulting problems caused by insufficient pre-planning or coordination of that system with existing systems.
- The need for providing consultation to programmers on a wide range of system planning.

D. Increased OCS Customer Involvement

It is felt that in order for OCS to provide a high quality of service to its customers, it is necessary for planning personnel to be aware of future customer requirements at the earliest possible time. Such advance notice will enable the OCS Staff to begin appropriate planning and system acquisition so that required computer support can be provided customer projects when needed. This will also enable an orderly expansion of the OCS computer system so that customer needs can be met, while making efficient use of resources.

The following are a few areas where major reservations were expressed by some or all of the members of the group as regards this report:

- The capacity of the switch hardware and/or software with specific respect to the possibility of incorporating the data bank concept.
- The scope of responsibility proposed for the systems group.
- The unknown hardware and/or software limitations of the components of the proposed computer system.
- The feasibility of arriving at a successful computer system without detailed engineering study.
- The availability of manpower to accomplish the necessary projects.

Appendix I

## Major Steps to Arrive at the Proposed System

The following is one possible sequence of steps that might be followed to arrive at the proposed system, assuming the current OCS system to be the starting point. It is realized that further study is needed and that such study might indicate a different schedule for accomplishing the job.

1. Link the 65 to the 67.

   This would provide a test production system on which OCS can gain experience with this type of system. Such a system cannot be considered a real production system, since the time sharing system is not currently backed up.

2. Link the time sharing system through a switch to the batch computers.

   This would move the RJE function from the 65 to the switch and would have the switch support the current RJE terminals. The job scheduler software would be designed and a simplified version implemented. This would be a pre-production system that would need backup for the time sharing system and switch before it could be considered a real production system.

3. Production System

   This would be the same system as outlined in Step 2, except that all components would be backed up and the volume of work it could handle would increase. The job scheduler would most likely do only fairly simple scheduling.

4. Add remote printers and additional remote work stations to system, improve the job scheduler.

   The system would now include remote printers located throughout the building and would also be connected to the DATACOM network. The scheduling of all jobs would be done by the job scheduler. The scheduling computer would also incorporate the functions of the Model 20's.

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5. Implement software switching of terminals between time sharing systems.

   Users could log on to a terminal and then be connected to any time sharing system.

6. Implement the data bank computer and connect it to the time sharing systems.

   Large files could be kept on common storage that all time sharing systems could access through a data computer. Batch machines could also use the data computer to store and retrieve data.


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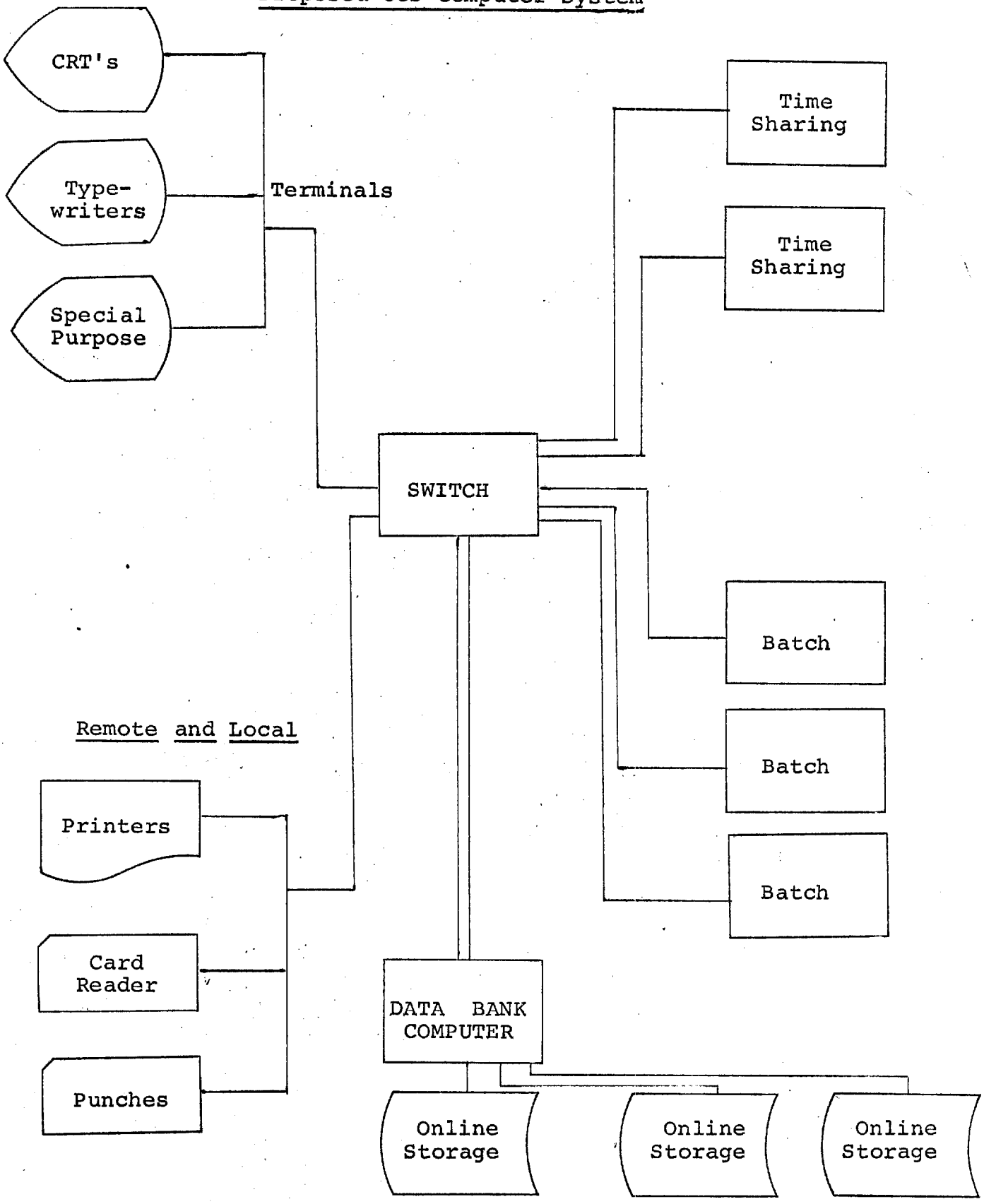
# A P P E N D I X II

## Proposed OCS Computer System



Appendix III

## Major Projects

1. Select a time sharing system to handle the file editing function for the system. Initiate action for installation of a system with backup.

2. Conduct engineering studies into the switch hardware to determine problem areas and limitations. Determine if COMCET can do the job and, if not, select a computer that has the needed capacity. Begin coding switch programs.

3. Begin design of job scheduler program or computer.

4. Begin a study into the problems of a data bank computer.

5. Make a study to determine probable computer resource requirements for the next two years to see if there are any real bottlenecks developing with the present system.

Appendix IV

## Priority vs FIFO Scheduling

Suppose a computer servicing jobs one at a time (PCP) and being fed by a random stream of jobs consisting of two types. Type 1 requires a short, constant process time. Type 2 requires a much longer process time which is exponentially distributed. Assume the following parameters:

Type 1: $\lambda_1 = .5$ jobs/min, $b_{11} = .2$ min, $b_{21} = b_{11}^2 = .04$ min$^2$

Type 2: $\lambda_2 = .1$ jobs/min, $b_{12} = 5$ min, $b_{22} = b_{12}^2 = 50$ min$^2$

Compare the operation of the system (1) without priorities and (2) with non-preemptive priority given to the type 1 jobs.

(1) Mean service, $b_1 = \frac{.5}{.6} * .2 + \frac{.1}{.6} * 5 = 1$ min

Second Moment, $b_2 = \frac{.5}{.6} * .04 + \frac{.1}{.6} * 50 = 8.36$ min$^2$

Utilization, $\rho = \lambda b_1 = .6 * .1 = .6$

Mean Wait Time, $T_w = \frac{\lambda b_2}{2(1-p)} = \frac{.6 * 8.36}{2(1-.6)} = 6.25$ min

Mean Queuing Time (type 1), $T_{q1} = T_w + b_{11} = 6.25 + .2 = 6.45$ min

Mean Queuing Time (type 2), $T_{q2} = T_w + b_{12} = 6.25 + 5 = 11.25$ min

Overall, $T_{q(avg)} = T_w + b_1 = 6.25 + 1.0 = 7.25$ min

(2) $U_1 = \lambda_1 b_{11} = .5 * .2 = .1$

$U_2 = \lambda_1 b_{11} + \lambda_2 b_{12} = .5 * .2 + .1 * 5 = .6$

Mean Wait Time

$$T_{w1} = \frac{\lambda b_2}{2(1-U1)} = \frac{.6 * 8.36}{2(1-.1)} = 2.8 \text{ min}$$

$$T_{w2} = \frac{\lambda b_2}{2(1-U1)(1-U2)} = \frac{.6 * 8.36}{2(1-.1)(1-.6)} = 7 \text{ min}$$

Mean Queuing Time

$T_{q1} = T_{w1} + b_{11} = 2.8 + .2 \doteq 3$ min

$T_{q2} = T_{w2} + b_{12} = 7.0 + 5.0 = 12$ min

Overall, $T_{q(avg)} = \frac{.5}{.6} * 3 + \frac{.1}{.6} * 12 = 4.5$ min

Note that with this priority scheme, type 1 jobs get through the system twice as fast as with no priority, whereas type 2 jobs are only slightly degraded.

Reference the analysis of a simple queue with a generalized service time distribution done by Khintchine and Pollaczek. The formulas for the mean values are usually known, and it turns out that the mean queue statistics depend only on the first two statistical moments of the service distribution and do not require the higher moments.

 15 April 1970

IBM 360/67 TERMINALS
PLANNED AND OPERATIONAL

| | | PLANNED | | | | OPERATIONAL | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Room | Scope (2260) | Type-Writer (2741) | Type-Writer (DATEL) | Other | Scope (2260) | Type-Writer (2741) | Type-Writer (DATEL) | Other | Scope (2260) | Type-Writer (2741) | Type-Writer (DATEL) | Other |
| DDS&T | | | | | | | | | | | | | |
| O/DDS&T | 6E6103 | | | | | | 1 | | | | 1 | | |
| FMSAC | | | | | | | | | | | | | |
| AID/RAB | 1D0011 | | | | | 1 | | | | 1 | | | |
| AID/CTR | 1D0030 | | | | | 1 | | | | 1 | | | |
| TAD | 1A39 | | | | ASR 28 | 1 | | 1 | 2780 | 1 | | 1 | 2 |
| OEL | | | | | | | | | | | | | |
| SSOC | 1D0023 | | | | | 1 | 1 | | | 1 | 1 | | |
| GSD | 5G11 | | | | | | 1 | | | | 1 | | |
| ASD | 5F38 | | | | | 1 | | | | 1 | | | |
| OSI | | | | | | | | | | | | | |
| | 6G20 | | | | | | 1 | | | | 1 | | |
| | 4G00A | | | | | 1 | 1 | | | 1 | 1 | | |
| OSP | | | | | | | | | | | | | |
| | 5B2825 | | | | | | 1 | | | | 1 | | |
| | 6B02B | | | | | | | 1 | | | | 1 | |
| OCS | | | | | | | | | | | | | |
| O/D | 2E29 | | | | | | 1 | | | | 1 | | |
| OPS/SP | GB1907 | | | | | | 1 | | | | 1 | | |
| | GB0702 | | | | | 1 | 1 | 1 | | 1 | 1 | 1 | |
| | -- | | | | | | | | 1443 | | | | 1 |
| | GB0708 | | | | | 1 | | | | 1 | | | |
| APS | GA0519 | 1 | 3 | | | | | | | 1 | 3 | | |
| ATS | 1D0421 | 1 | | | | | 1 | | | 1 | 1 | | |
| | 1D1601 | | | | | 1 | | | | 1 | | | |

15 April 1970

IBM 360/67 TERMINALS
PLANNED AND OPERATIONAL

| Component | Room | PLANNED | | | | OPERATIONAL | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Scope (2260) | Type-Writer (2741) | Type-Writer (DATEL) | Other | Scope (2260) | Type-Writer (2741) | Type-Writer (DATEL) | Other | Scope (2260) | Type-Writer (2741) | Type-Writer (DATEL) | Other |
| ISD | GD5309 | | | | | 1 | 1 | | | 1 | 1 | | |
| SAD | 2E13 | 1 | 2 | | | 2 | | | | 3 | 2 | | |
| MSD | GA2505 | 1 | | | | | | | | 1 | | | |
| | GD5307 | | | | | 1 | | | | 1 | | | |
| OPS/TS | GA0511 | 1 | | | | | | | | 1 | | | |
| OPS/Port-able | GC03 | | 1 | | | | | | | | 1 | | |
| OPS/Multi-Cust | | | 2 | | | 3 | | 3 | | 3 | 2 | 3 | |
| OPS/Pool* | | | | | | | | 6 | | | | 6 | |
| OPS/Sys Mgmt | | | | | | 1 | 1 | | | 1 | 1 | | |
| DDI | | | | | | | | | | | | | |
| CIA OPS Center | 7F30 | | | | | | 1 | | | | 1 | | |
| OSR/GFB | 3F43 | | | | | | 1 | | | | 1 | | |
| CRS | 1H46 | | | | | | 1 | | | | 1 | | |
| OER | 4G39 | | | | | 1 | | 1 | | 1 | | 1 | |
| DDP | | | | | | | | | | | | | |
| RID | GA50 | | | | | 2 | | | | 2 | | | |
| | GE50 | | | | | 2 | | | | 2 | | | |
| DDS | | | | | | | | | | | | | |
| OL | 1226 A | | | | | | | 1 | | | | 1 | |
| OS | | | | | | | | | | | | | |
| SR&CD | GE05 | | | | | 2 | 1 | | | 2 | 1 | | |
| SR&CD/CIB | 3E47 | 3 | | | | | | | | 3 | | | |
| TOTALS | | 8 | 5 | 0 | 0 | 14 | 7 | 11 | 0 | 24 | 14 | 3 | 0 |

* The number of terminals in the Operations Division pool will vary from time to time according to the number of devices delivered from the manufacturer and current requirements.

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# 2741 TERMINAL STATUS REPORT

| Req. No. | Date of Req. | Status | Component | Location | Contact | Ext. |
|---|---|---|---|---|---|---|
| 5 | 29 May 68 | Installed | OEL | 1D0023 | [redacted] | 6841 |
| 5 | 29 May 68 | Installed | OEL | 5G11 | | 4518 |
| 6 | 20 Jun 67 | Installed | ISD | GD5309 | | 4471 |
| 6 | 20 Jun 67 | Installed | 67 | GC03 | | 4292 |
| 6 | 20 Jun 67 | Installed | OCI | 7F33 | | 7551 |
| 6 | 20 Jun 67 | Installed | OSR | 3F43 | | 4053 |
| 6 | 20 Jun 67 | Installed | CRS | 1H46 | | 5951 |
| 7 | 24 Sep 68 | Installed | O/DDS&T | 6E6103 | | 4020 |
| 8 | 12 Aug 69 | Planned | SAD | 2E13 | | 6001 |
| 9 | | Planned | OPS | GC03 | | 6572 |
| 10 | 04 Jun 69 | Installed | OSP | 5B2825 | | 4037 |
| 11 | 17 Jan 69 | Installed | OSI | 6G20 | | 7911 |
| 11 | 17 Jan 69 | Installed | OSI | 4G00A | | 7911 |
| 12 | 12 Aug 69 | Installed | O/D/OCS | 2E29 | | 5402 |
| 14 | | Planned | OPS | GC03 | | 6572 |
| 14 | | Planned | OPS | GC03 | | 6572 |
| 17 | 12 Aug 69 | Installed | ATS | 1D0421 | | 7331 |
| 18 | 14 Oct 69 | Installed | Portable | GE05 | | 7847 |
| 19 | 17 Dec 69 | Installed | OPS/SP | | | 4471 |
| 19 | 17 Dec 69 | Installed | OPS/SP | | | 4471 |
| 20 | 29 Oct 69 | Planned | APS | GA0519 | | 4311 |
| 20 | 29 Oct 69 | Planned | APS | GA0519 | | 4311 |
| 28 | 15 Dec 69 | Planned | APS | GA0519 | | 4311 |
| 30 | 02 Apr 70 | Planned | SAD | 2E13 | | 6001 |

STATINTL

15 April 1970

# 2260 TERMINAL STATUS REPORT

| Req. No. | Date of Req. | Status | Component | Location | Contact | Ext. |
|---|---|---|---|---|---|---|
| 1 | | Installed | 67 | GC03 | [redacted] | 5717 |
| 2 | | Installed | OS | GE05 | | 7330 |
| 2 | | Installed | OS | GE05 | | 7330 |
| 3 | 14 Jun 68 | Installed | RID | GA50 | | 4546 |
| 3 | 14 Jun 68 | Installed | RID | GA50 | | 4546 |
| 3 | 14 Jun 68 | Installed | RID | GA50 | | 4546 |
| 3 | 14 Jun 68 | Installed | RID | GA50 | | 4546 |
| 4 | 31 Dec 68 | Installed | FMSAC | 1D0011 | | 5224 |
| 4 | 31 Dec 68 | Installed | FMSAC | 1D0011 | | 5224 |
| 4 | 31 Dec 68 | Installed | FMSAC | 1A39 | | 5224 |
| 5 | 29 May 68 | Installed | OEL | 1D0023 | | 6814 |
| 5 | 29 May 68 | Installed | OEL | 5F38 | | 4518 |
| 8 | 12 Aug 69 | Installed | SAD | 2E13 | | 6001 |
| 8 | 12 Aug 69 | Installed | SAD | 2E13 | | 6001 |
| 8 | 12 Aug 69 | Planned | SAD | 2E13 | | 6001 |
| 11 | 17 Jan 69 | Installed | OSI | 4G00A | | 5788 |
| 13 | 12 Aug 69 | Installed | ISD | GD5309 | | 4471 |
| 14 | | Installed | OPS | GC03 | | 6572 |
| 14 | | Installed | OPS | GC03 | | 6572 |
| 14 | | Installed | OPS | GC03 | | 6572 |
| 16 | | Planned | MSD | GA2505 | | 5553 |
| 16 | | Installed | MSD | GD5307 | | 5553 |
| 17 | 12 Aug 69 | Planned | ATS | 1D0421 | | 7331 |
| 17 | 12 Aug 69 | Installed | ATS | 1D1601 | | 7331 |
| 18 | 14 Oct 69 | Planned | OS | 3E47 | | 5507 |
| 18 | 14 Oct 69 | Planned | OS | 3E47 | | 5507 |
| 18 | 14 Oct 69 | Planned | OS | 3E47 | | 5507 |
| 19 | 17 Dec 69 | Installed | OPS/SP | | | 4471 |
| 19 | 17 Dec 69 | Installed | OPS/SP | | | 4471 |
| 20 | 29 Oct 69 | Planned | APS | GA0519 | | 4311 |
| 20 | 29 Oct 69 | Planned | TS/OPS | GA0511 | | 6078 |
| 21 | 29 Oct 69 | Installed | OER | 4G39 | | 5943 |

STATINTL

15 April 1970

# DATEL TERMINAL STATUS REPORT

| Req. No. | Date of Req. | Status | Component | Location | Contact | Ext. |
|---|---|---|---|---|---|---|
| 15 | 06 Jun 69 | Installed | OL | 1226 Ames | [redacted] | 3046 |
| 22 | 18 Nov 69 | Installed | FMSAC | 1A39 | | 5009 |
| 10 | 04 Jun 69 | Installed | OSP | 6B02B | | 4037 |
| | | Installed | OPS/SP | GB0702 | | 4471 |
| 21 | 29 Oct 69 | Installed | OER | 4G39 | | 5943 |

STATINTL